

NASA TECH BRIEF



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Static Electricity of Polymers Reduced by Treatment with Iodine

The problem:

To develop a method to improve the electrical conductivity of organic polymers. Unmodified organic polymers as a class show a very low degree of conductivity and permit a buildup of static electricity when near certain types of electrical equipment. Known modified polymers are expensive to fabricate because they require fillers or bound metal salts.

The solution:

Treat the organic polymers with iodine. Using a simple diffusion process, products of desired properties may be custom formulated because in many cases product properties are uniformly predictable.

How it's done:

Poly-N-vinylcarbazole is precipitated twice from benzene and methanol and dried in a vacuum oven at 50°C. The high molecular weight polymer is dissolved in spectroscopic grade dichloromethane solvent. Iodine is then added to the solution, and the solvent is removed at 0°C under vacuum in a rotating flask. The diffusion of iodine vapor into commercial polymeric films is an alternative and convenient technique.

Notes:

1. This concept of increased conductivity by iodine modification has been substantiated by laboratory studies of thin films of poly-N-vinylcarbazole.
2. Commercial structural plastics, rubbers, and fibers resistant to static electricity effects are required for a wide variety of explosion-prone environments and working zones such as, for example, in a naphtha dry cleaning plant. Utility is also foreseen in the medical field where surgical instruments and garments are used in the presence of explosive anesthetic vapors.
3. Inquiries concerning this innovation may be directed to:

Technology Utilization Officer
NASA Pasadena Office
4800 Oak Grove Drive
Pasadena, California 91103
Reference: B67-10132

Patent status:

No patent action is contemplated by NASA.

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